



SONet:

A Community-Driven **Scientific Observations Network** to
achieve Semantic Interoperability of Environmental and
Ecological Data
(NSF OCI-INTEROP 0753144)

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Observational data

Much earth and life science data consists of
OBSERVATIONS:

- *Measurements* (categorical, numerical) of some
- *Characteristics* (attributes, properties) of some
- *Entity* (specimen, phenomenon, “thing”)

Motivation

Many “semantic” efforts in earth/biodiversity/environmental sciences, exploring use of ***observational construct as foundational template for organizing data***

Specialized concerns of different domains may drive semantic solutions to be ***diverse and incompatible***

Opportunity for communicating among different domains to achieve ***greater interoperability*** of emerging semantic technology solutions through a ***shared core model for observations***

Observational data models...

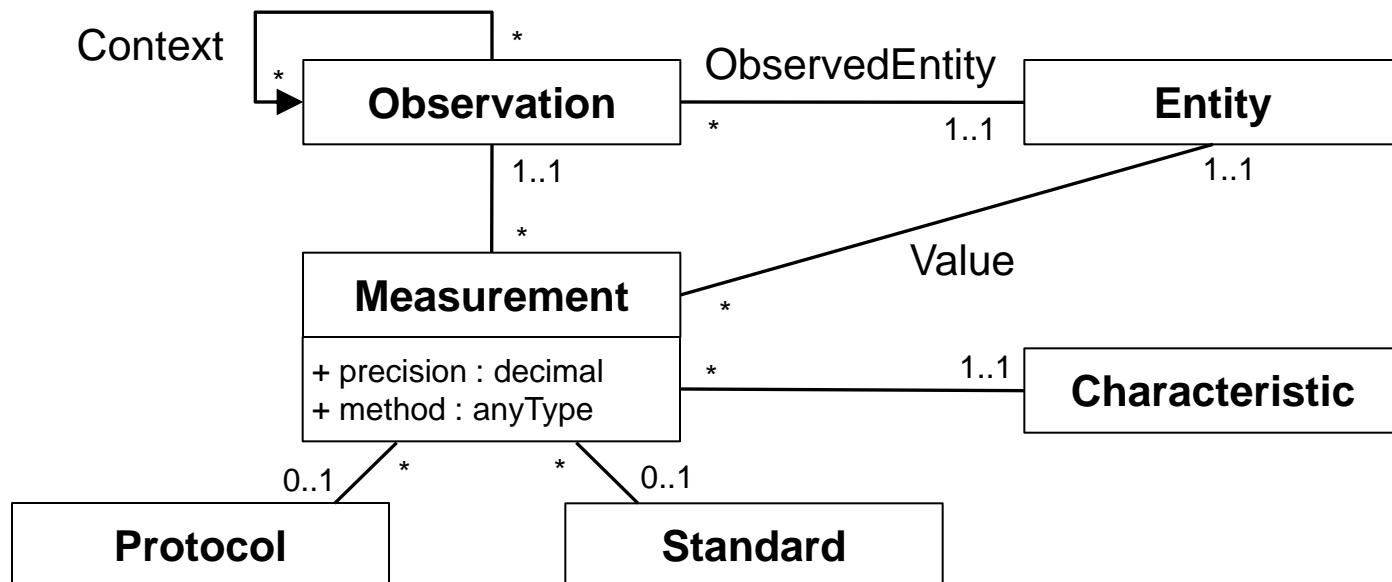
Project	Domain	Observational data model
VSTO	Atmospheric sciences	Ontologies for interoperability among different meteorological metadata standards and other atmospheric measurements
SERONTO	Socioecological research	Ontology for integrating socio-ecological data
OGC's O&M	Geospatial	Observations and Measurements standard for enhancing sensor data interoperability
SEEK's OBOE	Ecology	Extensible Observation Ontology for describing data as observations and measurements
PATO's EQ	Phenotype/Evolution	Underlying model for describing phenotypic traits to link with genomic data

Formalizing the Observational Data Model



SONet

- Implemented as an OWL-DL ontology
 - Provides basic concepts for describing observations
 - Specific “extension points” for domain-specific terms



Similarities among Observational Data Models

SONet's OBOE Extensible Observation Ontology

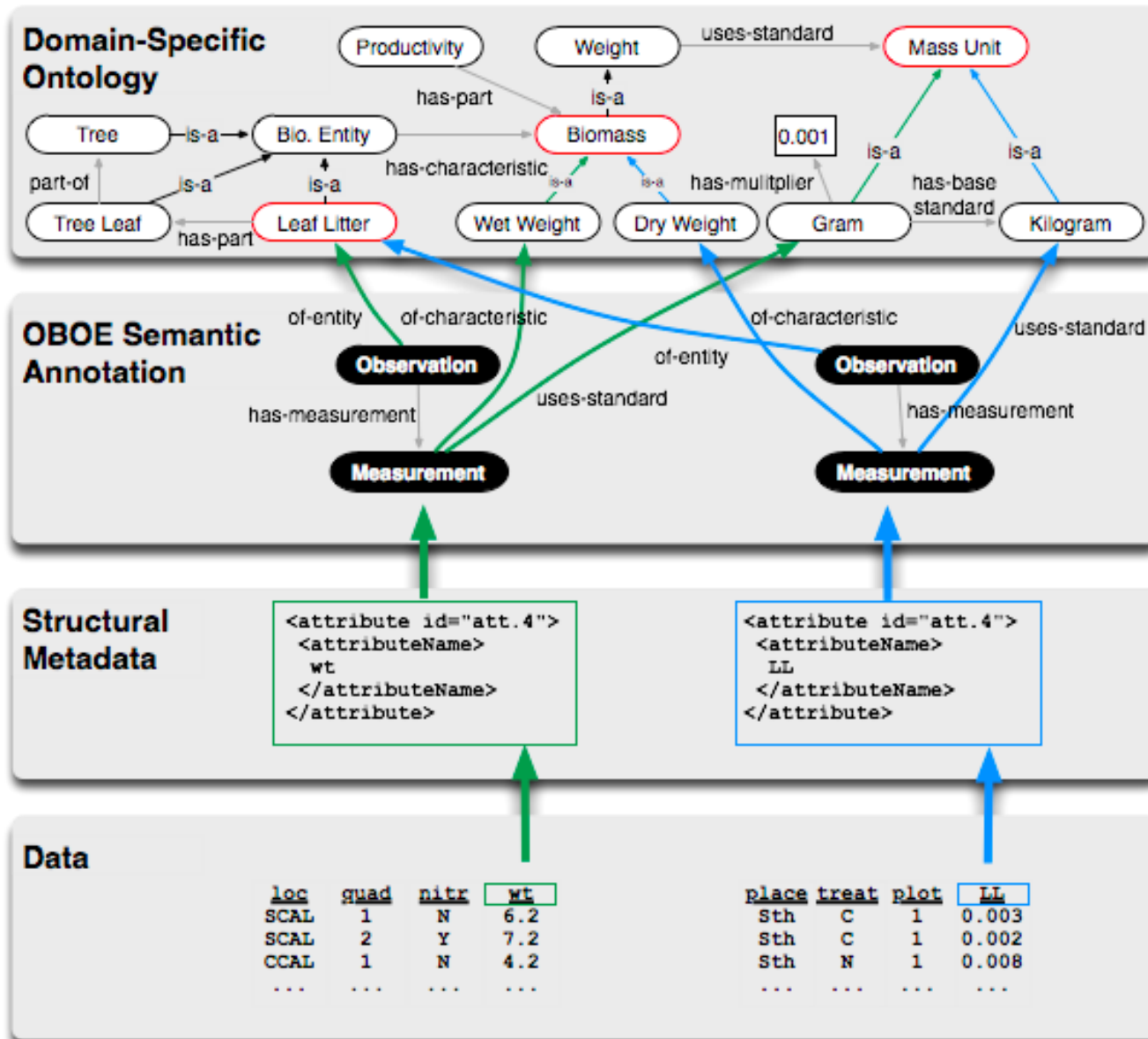
OGC's Observations and Measurements



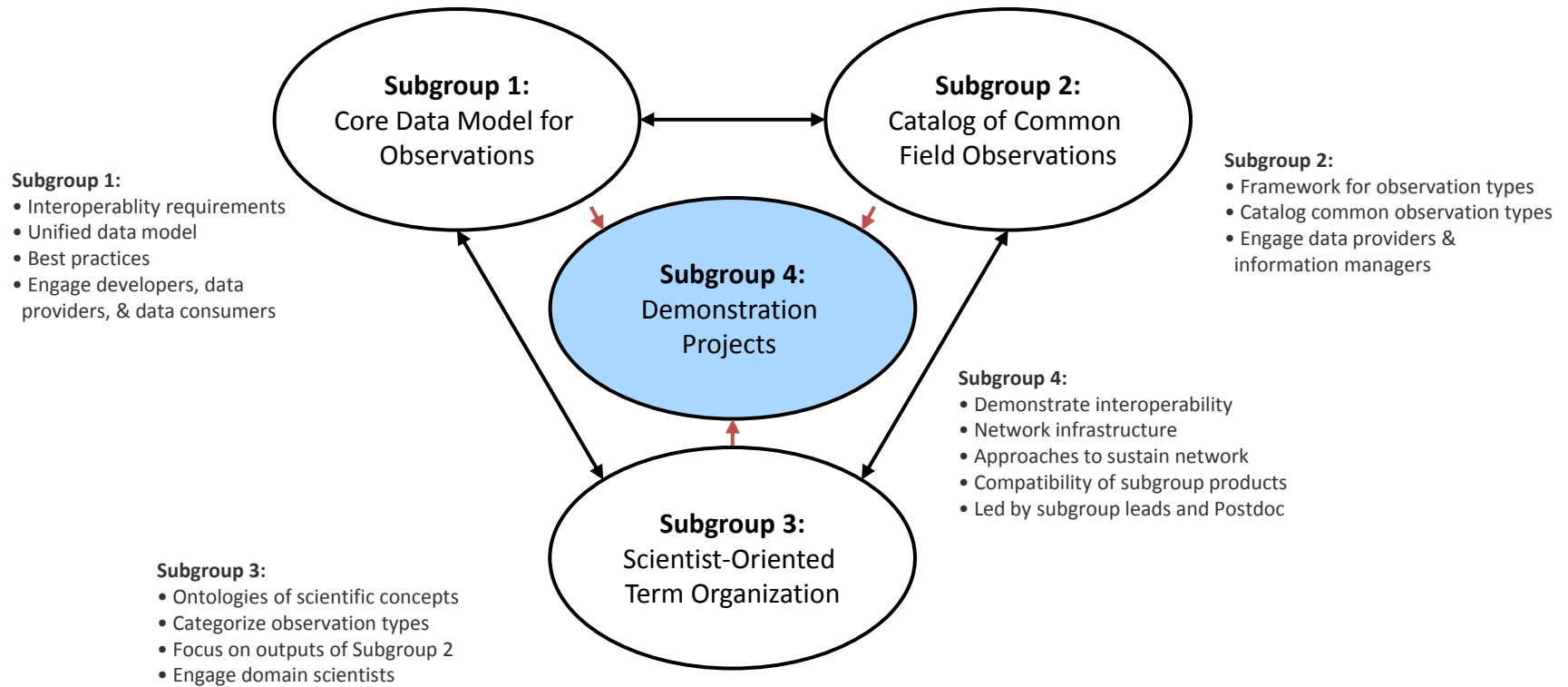
Semantic Annotation: linking data values to concepts through observations

- Observational data models provide high-level, domain-neutral abstraction of scientific observations and measurements
- Link data (or metadata) through observational data model to *terms from domain-specific ontologies*
- *Context* can inter-relate values in a tuple
- Provide clarification of semantics of data set as a whole, not just “independent” values or single attributes

Semantic annotation



SONet Activities



Selected Synergies



- *Semtools effort (NSF ABI)*
 - *Extending Morpho metadata editor to permit semantic annotation; close links with KNBrepository that is an initial node on DataONE*
- *OGC Observations and Measurements*
 - *Working with OGC developers to assure compatibility with the OGC/ISO “O&M” specification (in XMLS)*
- *DataONE Semantics Working Group (NSF Datamet)*
 - *Cross-project participants from SONet involved in discussing semantics approaches for use in DataONE (McGuinness co-chair; Schildhauer, Bermudez, Lapp members)*
 - *Questions / info: d1m@cs.rpi.edu or schild@nceas.ucsb.edu*
 - <http://sonet.ecoinformatics.org>